

File Ref: AC23219 – 02 – R1

12 September 2023

Mr A. Johnson  
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Email: Alan@nzmca.org.nz

Dear Alan,

**Re: Proposed NZMCA Pirongia Road – Te Awamutu motorhome park  
Assessment of Environmental Noise Effects**

Acoustic Engineering Services (AES) have been engaged to provide an assessment of environmental noise effects in relation to an application for a Resource Consent for the proposed NZMCA motorhome park at 2 Pirongia Road, in Te Awamutu. The proposed motorhome park will have capacity for 75 self-contained vehicles such as caravans, motorhomes/buses, and campervans. The Applicant requires an assessment of the environmental noise emitted by this activity, with regard to section 104 (1) of the Resource Management Act 1991 (RMA), which requires the actual and potential effects of the activity on the environment to be considered.

Our analysis is based on our correspondence and the following documentation:

- Assessment of Environment Effects Proposal, prepared for Waipa District Council, as prepared by New Zealand Motor Caravan Association, and dated the 8<sup>th</sup> of June 2022.
- Report titled New Zealand Motor Caravan Association Vehicle Movement Surveys, as prepared by Opus, and dated the 22<sup>nd</sup> of December 2016.

Please find our analysis and recommendations below.

## 1.0 SITE AND PROPOSED ACTIVITY

The proposed motorhome park is to be located at 2 Pirongia Road, in Te Awamutu and has the legal description PT ALOT 317. The site is located within a Rural Zone, and those surrounding it are a mixture of Rural, Special Industrial and Residential Zones as defined in the Waipā District Plan and indicated in figure 1.1 below. The overall site boundary is highlighted in red, and the site location is outlined in blue.



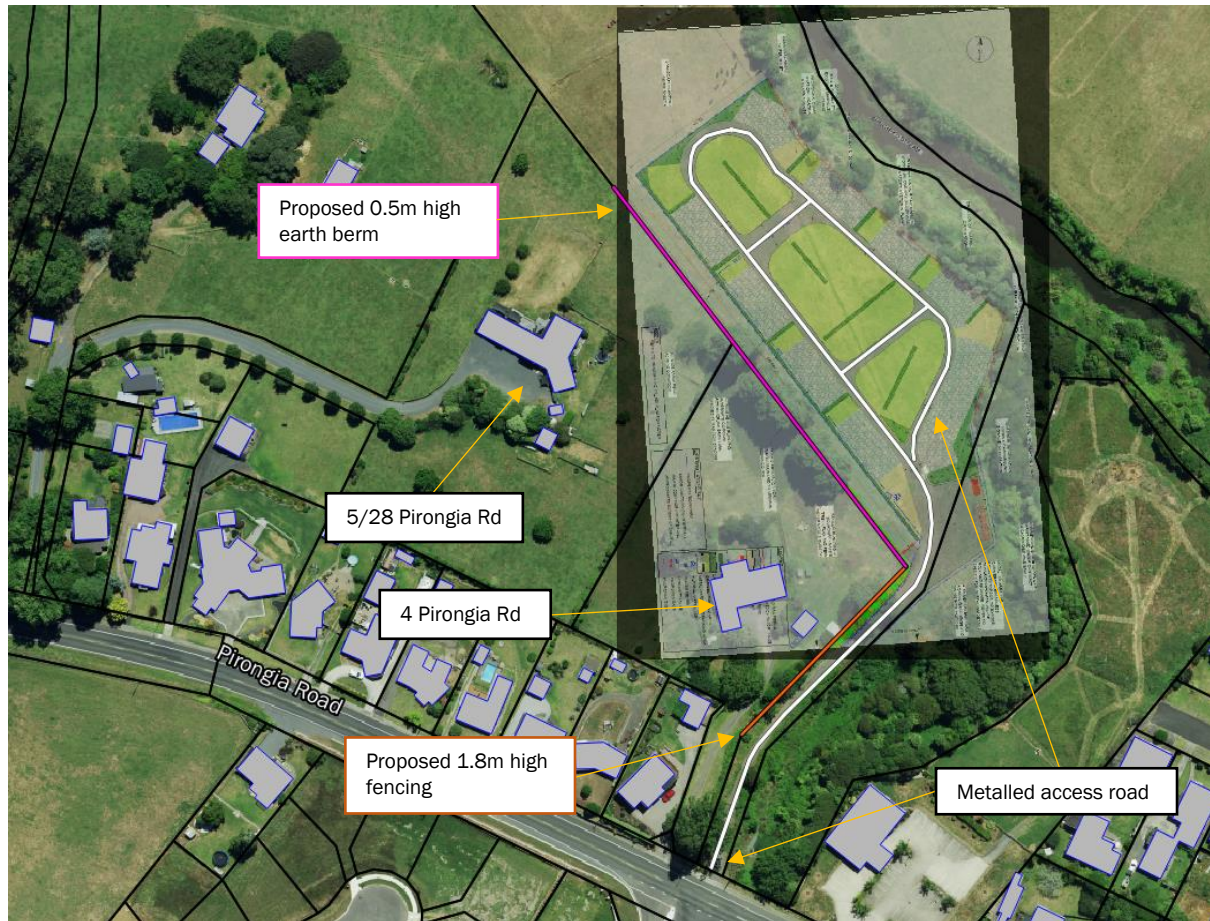
Figure 1.1 – Site and surrounding area

The closest residential dwelling is located at 4 Pirongia Road, which is to the east of the access driveway and 5/28 Pirongia road situated to the south of the motorhome site, both of these sites are located in the Rural Zone. Other residential dwellings are also located to the further to south of the site within the Rural and Residential Zones.

We understand the site occupancy is expected to be less than 50 % for the majority of the year. The size of the members vehicles varies from relatively small campervans through to large fifth wheelers (e.g. a camper trailer connected in the bed of a truck or a towing ute). We understand that the current registered NZMCA vehicles are split as follows:

- Motorhomes / campervans      52.0 %
- Caravans                              38.0 %
- Converted buses                    8.5 %
- Fifth wheel (large caravans)    1.5 %

Access to the site is via Pirongia Road at the entrance located in the southeast corner of the site. The access road is a metalled driveway which runs up the from the south and wraps around the site. The site plan is shown in figure 1.2 below.



**Figure 1.2 – Proposed motorhome park site plan**

Based on discussions with the Client, we understand that the following acoustic boundary treatment is proposed:

- A minimum 1.8 metre high solid timber fencing along the common boundary between the motorhome access driveway and the 4 Pirongia Road property, as shown in orange in figure 1.2 above.
- A 0.5-metre-high earth berm along the shared boundary between the motorhome park and the two residential dwellings to south, as shown in pink in figure 1.2 above.

The following minimum requirements would need to be met in order for the fencing to be considered as an acoustically effective barrier:

- Height – minimum 1.8 metres
- Surface mass – at least 10 kg/m<sup>2</sup> (e.g. 25 mm timber palings)
- The fence must be continuous and maintained with no gaps or cracks. For timber fences, this will require palings to be well overlapped (25 mm minimum) or a “board and batten” system, and a sleeper rail connecting the base of the palings to the ground. We also recommend a paling thickness of at least 25 mm to help resist warping.



## 2.0 ACOUSTIC CRITERIA

Section 104 of the RMA requires adverse effects associated with the proposal to be considered. Guidance as to the impact of adverse noise effects may be obtained from several sources.

### 2.1 District Plan noise limits

As described above, the site is located in the Rural Zone as defined in the Waipā District Plan. The noise limits for sound received in the relevant zones are outlined in *Part D Zone Provisions, Section 04 Rural Zone, Rule 4.4.2.15 Noise*, as follows:

*Noise from all activities shall not exceed the following limits with the notional boundary of any dwelling:*

Daytime	(0700 – 2200 hours)	50 dB $L_{Aeq}$	
Night-time	(2200 – 0700 hours)	40 dB $L_{Aeq}$	70 dB $L_{Amax}$

The Waipā District Plan states that the noise shall be measured in accordance with NZS 6801:2008 *Acoustics – Measurement of Environmental Sound* and be assessed in accordance with NZS 6802:2008 *Acoustics – Environmental Noise*. NZS 6802:2008 does not provide an assessment period but recommends a 15-minute measurement interval for fluctuating continuous sound.

### 2.2 New Zealand Standard 6802:2008

NZS 6802:2008 *Acoustics – Environmental noise* outlines a guideline daytime limit of 55 dB  $L_{Aeq(15\ min)}$  and a night-time noise limit of 45 dB  $L_{Aeq(15\ min)}$  at any point within the notional boundary of a rural dwelling for “the reasonable protection of health and amenity associated with the use of land for residential purposes”. The Standard also recommends a night-time  $L_{max}$  noise limit of 75 dB  $L_{AFmax}$  to prevent sleep disturbance.

The Standard also describes how a - 4 dB duration adjustment may be applied to sound received for less than 40 % of the daytime period. For sound which varies considerably in level over the daytime period but does not completely ‘switch off’, a similar outcome may be obtained by considering the energy average. This adjustment is not permitted during the night-time period.

A + 5 dB penalty is also applied to sources which contain Special Audible Characteristics (for example tonal, or impulsive noise). Such a penalty is not typically applied to vehicle, or people noise.

### 2.3 World Health Organisation

Guidelines for Community Noise<sup>1</sup>, a document produced by the World Health Organisation based on extensive international research recommends a guideline limit of 55 dB  $L_{Aeq}$  to ensure few people are seriously annoyed in residential situations. A guideline limit of 50 dB  $L_{Aeq}$  is recommended to prevent moderate annoyance. A guideline night-time limit of 45 dB  $L_{Aeq}$  / 60 dB  $L_{AFmax}$  is recommended to allow occupants to sleep with windows open. These guidelines are measured at the facade of dwellings and other noise sensitive locations and the  $L_{Aeq}$  values apply for 16 hours in the daytime, and 8 hours in the night-time.

### 2.4 Discussion regarding appropriate noise levels

We observe that the 50 dB  $L_{Aeq}$  District Plan daytime noise limit is more conservative than the upper limits recommended by WHO and NZS 6802:2008 for the protection of residential amenity. However, it is consistent with the lower guideline limit in the WHO guidance and reflects a typical District Plan control for residential areas in New Zealand. Based on the above guidance, and considering the use of the neighbouring

<sup>1</sup> Edited by Berglund, B et al. *Guidelines for community noise*. World Health Organization 1999

sites, we expect noise effects from activities associated with the proposed motorhome park to be minimal if compliance with the District Plan daytime noise limits is achieved.

The District Plan night-time noise limit of 40 dB  $L_{Aeq}$  is also a typical limit for residential areas throughout New Zealand. However, this limit is lower than the threshold of 45 dB  $L_{Aeq}$  discussed in the WHO Guidance which applies at the facade of dwellings and is intended to protect against sleep disturbance for residents with windows ajar for ventilation. Therefore, we expect occasional events which generate noise levels of more than 40 dB  $L_{Aeq(15min)}$  at the notional boundary, but do not exceed 45 dB  $L_{Aeq}$  or at the dwelling facades, to also have a minimal adverse effect.

### 3.0 NOISE GENERATED BY TYPICAL ACTIVITY ON THE SITE

Potential noise sources associated with the operation of the campsite are expected to be:

- Noise associated with people.
- Noise from vehicles on site and using the access driveway.
- Noise from onsite temporary gas-powered generators.

We have considered noise from each of these sources in the following sections.

SoundPLAN computational modelling based on ISO 9613 *Acoustics – Attenuation of sound outdoors – Part 2: General method of calculation* has been used to calculate the propagation of noise from activities associated with the Pirongia Motorhome Park, taking into account the topography of the area, worst-case downwind conditions, and sound power levels for the noise sources.

#### 3.1 Proposed mitigation

Expected noise levels associated with the proposed campsite have been calculated taking into account the following mitigation:

- Site fencing / bunding as described in section 1.0 above.
- On-site generators will only be used between 0800 and 2000 hours, and in locations which are more than 25 metres from a residential boundary.
- Noise management measures will be put in place via the members' Travel Directory (publication, website, and app versions) and a sign on site. The Travel Directory will advise members to "Please arrive and depart the site between 7 am and 10 pm only." The onsite sign will remind members that "the campsite is located within a rural residential area, and its residents enjoy living a peaceful lifestyle. Please keep this in mind while enjoying your lifestyle here, including planning your arrival and departure times between daytime hours only (7 am to 10 pm)."

#### 3.2 Noise from vehicles

We have assessed the noise effects of vehicle movements associated with the proposed motorhome park site. This includes vehicles travelling on the access driveway and vehicles manoeuvring within the park site boundaries.

As outlined above, a range of vehicles are expected on site. We have considered heavy vehicles with a sound power of 105 dB  $L_{WA}$  and light vehicles with a sound power of 98 dB  $L_{WA}$  travelling at 10 km/hr on an unsealed surface.

### 3.2.1 Daytime vehicle movements (0700 – 2200 hours)

The NZMCA Trip Generation Study provides values for the number of vehicle movements per vehicle type and indicates that for a site with a maximum capacity of 75 vehicles, that peak daily vehicle movements would be 150 movements, and in a peak hour 7 heavy vehicle and 20 light vehicle individual movements can be expected, split evenly between inbound and outbound.

If a sound is not present all of the time it is likely to create lesser annoyance than the same sound if it was continuously present. Based on the 'energy average' approach to duration adjustments outlined in section 6.4.6 of NZS 6802:2008 and considering the likely variation in noise emissions from all sources over a particular day, we expect an adjustment of at least –4 dB to apply when determining the rating level of the sound. The anticipated noise rating levels at the adjacent sites are presented in table 3.1 below.

We note that this modelling is also based on a worst-case scenario of the vehicles entering the motorhome park via the access driveway, and all following the path closest to the residential dwelling (left when entering the park site), doing a loop of the road while trying to find a parking space.

**Table 3.1 – Predicted daytime noise emissions (dB L<sub>Aeq</sub>(15 min))**

Site	District Plan noise limit (daytime)	Predicted daytime noise level (notional boundary)
4 Pirongia Road	50	50
5/28 Pirongia Road		47

As shown in table 3.1 above, noise from vehicle movements at the proposed motorhome park site is expected to achieve full compliance with the daytime District Plan noise limits. Furthermore, the assessed daytime noise levels represent peak occupancy, which is only expected to occur on 1 – 2 days per year. For the remainder of the year, we would expect significantly less vehicle movements than the assessed peak hour, and we would expect full compliance with the District Plan noise limits to be readily achieved. Therefore, we would expect the daytime noise effects of vehicle movements associated with the proposed motorhome park to be minimal.

### 3.2.2 Night-time vehicle movements (2200 – 0700 hours)

As outlined in section 3.1 above, noise management measures have been proposed to discourage the arrival / departure of vehicles during the night-time period. NZMCA has also advised that vehicle movements during the night-time period are likely to only occur due to necessity as most NZMCA members do not prefer to be on the road at night-time.

Based on the Opus vehicle movement study, for a site with 75 vehicles no more than 8 night-time vehicle movements would be expected *per week* during the hours of 2200 to 0700. When taking this into account, in conjunction with the noise management measures to be included in the site documents, we consider it reasonable to consider a scenario with one heavy vehicle movement or one light vehicle movement in a 15-minute period during the night-time.

Based on this, we expect the noise levels outlined in table 3.2 below. These values do not include a duration adjustment as they occur during the night-time period.

**Table 3.2 – Predicted night-time noise emissions (dB L<sub>Aeq(15 min)</sub>)**

Site	District Plan noise limit (night-time)	Predicted night-time noise level (notional boundary)		Predicted night-time noise level (facade of dwelling)	
		Heavy vehicles	Light vehicles	Heavy vehicles	Light vehicles
4 Pirongia Road	40	49	43	45	39
5/28 Pirongia Road		47	40	44	37

Based on table 3.2, if one light vehicle entered / exited the site during the night-time period, noise levels up to 43 dB L<sub>Aeq</sub> could be expected at the notional boundary of the 4 Pirongia Road property, reducing to 39 dB L<sub>Aeq</sub> when received at the facade. Higher noise levels would be expected to occur if a converted bus or a 5<sup>th</sup> wheel vehicle travelled on the access road during the night-time period. However, as mentioned above, very few night-time movements are expected for any vehicle type, and these 'heavy vehicles' only make up 10 % of the owner's fleet. These occurrences are therefore expected to be very rare (for example, once a week, during peak season) and resulting noise levels are expected to be in the order of 45 dB L<sub>Aeq(15 min)</sub> at the facades of both residential dwellings.

As outlined in section 2.4 above, noise levels of 45 dB L<sub>Aeq(15 min)</sub> or less at the facade of dwellings are not expected to cause sleep disturbance. Therefore, considering this a peak occupancy scenario and night-time vehicle movements are expected to only occur very rarely (8 movements per week), and that residential receivers are not expected to have their sleep disrupted even if they have windows open for ventilation, we therefore expect noise effects to be minimal.

During all other times of the year (not peak season) we would expect night-time vehicle movements to be even more infrequent. We note campers should generally be discouraged from arriving and departing the site at night-time and vehicle movements should be limited to occurring in the daytime period where practical.

We have also considered the maximum (L<sub>AFmax</sub>) noise levels received at nearby residential sites. Maximum noise levels due to door slams and engine starts of heavy vehicles have been based on a noise level of 105 dB L<sub>AFmax</sub>. We would expect noise levels of 70 dB L<sub>AFmax</sub> or less at the notional boundaries of 4 and 5/28 Pirongia Road, and therefore full compliance is achieved with the 70 dB L<sub>AFmax</sub> District Plan night-time maximum noise limit.

### 3.3 Noise from people

We understand that when on site NZMCA members spend most of their time inside their vehicles and noise levels from people are largely self-regulated due to the presence of other campers on site. Expected noise levels due to the conversation of people in outdoor areas have been calculated based on the American National Standards Institute Standard ANSI S3.5 – 1997 Methods for calculation of the Speech Intelligibility Index, which contains information on the typical speech levels for both male and female speakers. Based on average values, for a normal voice effort, the sound power of a speaker may be deduced to be 71 dB L<sub>WA</sub>.

If all 75 campsites had two people and half were speaking outside in a normal voice for a 15-minute period, the noise rating level at the notional boundary of the nearest residential dwellings (4 and 5/28 Pirongia Road) would be in the order of 38 dB L<sub>Aeq(15 min)</sub>. We note that in line with NZS6802:2008 this includes an energy average adjustment of –4 dB.

Noise from people staying at the motorhome park is therefore expected to comply with the District Plan daytime noise limits at 4 and 5/28 Pirongia Road by some margin, and we expect adverse noise effects with be negligible during the daytime.

We also note the NZMCA handbook states that guests must be quiet between 2200 and 0700 hours. If guests abide by this policy, during the night-time hours of 2200 to 0700 hours we expect compliance with the District Plan limits to be achieved.

### 3.4 Noise from generators

We understand some NZMCA members may use gas powered generators for small periods of time to provide power to their vehicles. The NZMCA policy allows members to use generators onsite for a maximum of two 2-hour stints only between the hours of 0800 and 2000.

From previous experience with NZMCA projects we understand that the generators can have sound powers of up to 88 dB  $L_{WA}$ . Noise from generators is expected to comply with the District Plan daytime noise limit of 50 dB  $L_{Aeq}$  when measured at the adjacent notional boundaries of 4 and 5/28 Pirongia Road, provided they are operated at least 24 metres from the shared southern boundary. We therefore recommend that the use of the generators are prohibited in the parking spaces nearest to the shared boundary to increase the distance from the generators and the residential dwellings.

With this restriction in place, we would expect full compliance with the daytime noise limit to be achieved, and for the effects at all receivers to be minimal.

### 3.5 Cumulative noise

During the daytime, noise from vehicles arriving, people talking, use of generators and other facilities will occur in some capacity at the same time. However, because of the worst-case manner in which we have assessed the individual sources above, we do not expect that these would combine to result in noise levels which exceed the noise levels individually assessed in the sections 3.2 – 3.4.

## 4.0 CONCLUSION

We have assessed the potential noise effects associated with the proposed NZMCA motorhome park located at 2 Pirongia Road, in Te Awamutu.

Based on national and international guidance, we expect that where noise levels comply with the District Plan day and night-time noise limits, noise effects from activities associated with the proposed motorhome park will be minimal. In addition, we expect occasional night-time events which generate noise levels of more than 40 dB  $L_{Aeq(15min)}$  at the notional boundary but do not exceed 45 dB  $L_{Aeq(15min)}$  at the dwelling facades to also have a minimal adverse effect.

With the mitigation measures outlined above, we expect full compliance with the daytime noise limits at all times and for the effects to be minimal. During the night-time period, we expect that compliance with the noise limits will be generally achieved, apart from rare night-time arrival of vehicles to the site which may generate up to 45 dB  $L_{Aeq(15min)}$  at the façade of dwellings. As this noise would not be expected to cause sleep disturbance even with bedroom windows open, and will only occur occasionally, we expect any adverse effect to be minimal.

Please do not hesitate to get in contact if you wish to discuss further.

Kind Regards,



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